Charles F. Hurley Building
Case Study

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Bureau of State Office Buildings

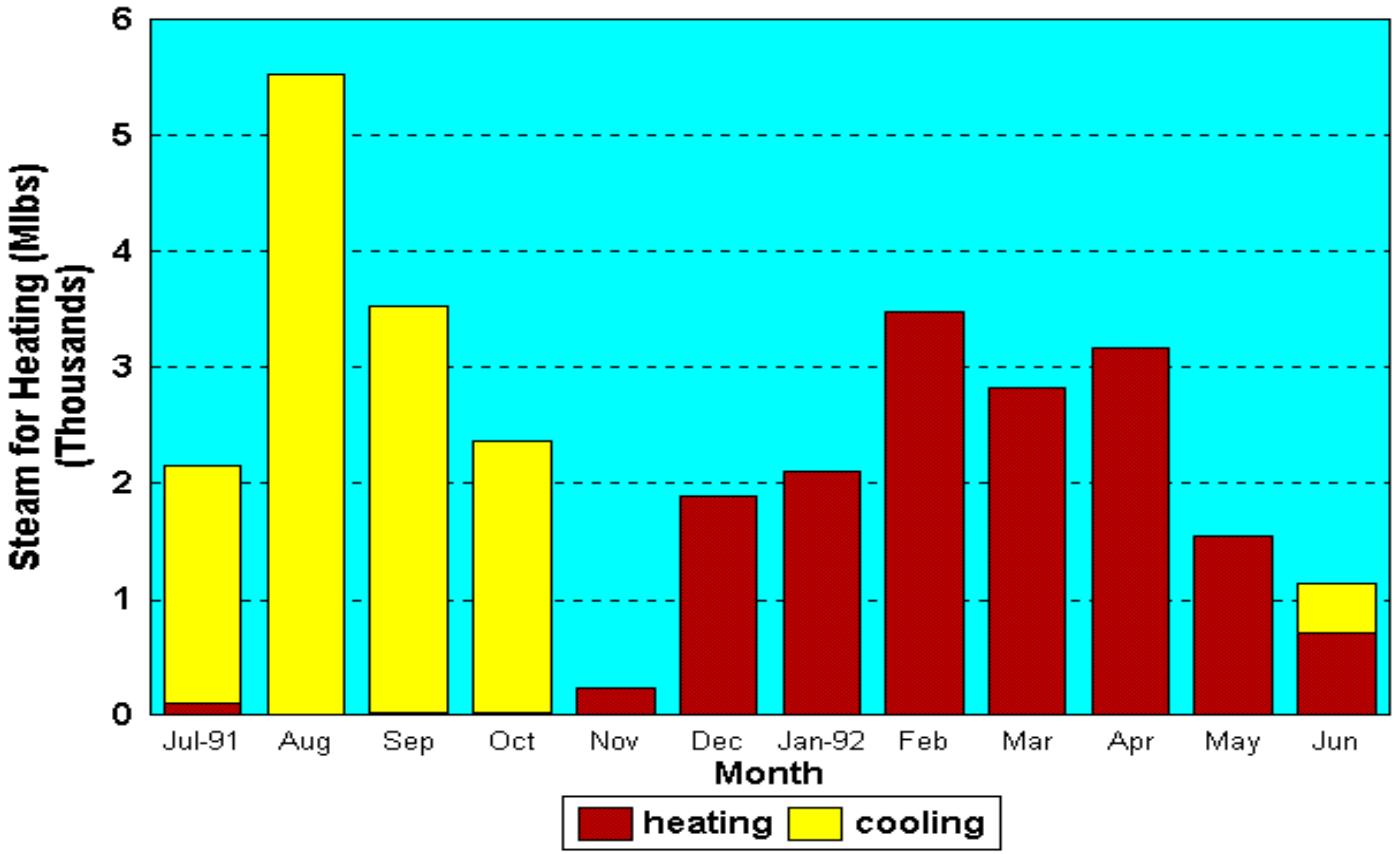
Hurley Building

- Built in 1971
- Poured concrete construction
- Department of Employment and Training & Group Insurance Commission
- 6 floors office plus 2 level parking garage
- 340,000 square feet office, 15,000 square feet computer

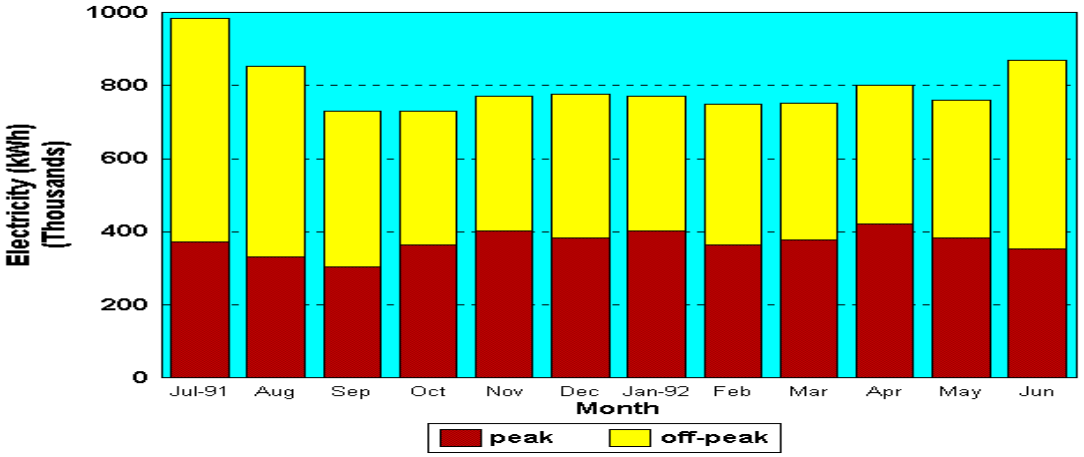
Hurley Building
Original HVAC Equipment

- Steam absorption cooling plant generating chilled water for cooling
- Raw steam for building heating
- Electric powered DX units to cool the computer room, containing CFCs
- Steam powered water heater
- Pneumatic controls with minimum automation

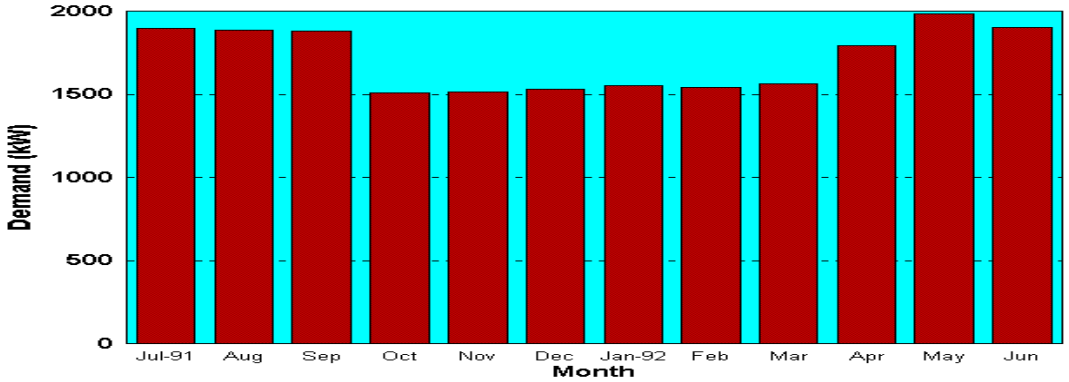
Hurley Building
Heating and Cooling Steam Use



Hurley Building
Electricity Use



- Monthly electricity consumption 1991-92



- Monthly electricity demand 1991-92

Hurley Building
Project Scenario

- Catastrophic failure of absorption cooling plant in 1992
- Rising cost of steam/water, ~20% increase from 1989 to 1992
- Expensive maintenance contract for systems
- Computer room cooling units at end of life

Hurley Building
Project Challenges

- Need to restore cooling capabilities before the summer of 1993
  - office space cooling
  - computer room cooling
- Fuel switch
  - from steam to natural gas or electricity
  - must also replace heating and hot water systems
- Space, weight and routing constraints of 6th floor mechanical room

Hurley Building
System Solution

- Gas fired chiller/heaters installed
- Computer room cooling tied into chiller/heater
- Domestic hot water fueled with natural gas
- Energy Management System installed
- Lighting improvements coincident with project
- New maintenance contract

Hurley Building
Chiller/Heater

- **Chiller/heaters installed for main cooling and heating**
  - **2 York 600 ton absorption chiller/heaters**
  - **natural gas fired**
  - **require hydronic coils to allow air handling units to use hot water instead of steam**

Hurley Building
Other HVAC Systems Changes

- **Water heating**
  - kitchen and lavatory hot water supply
  - converted from steam to natural gas fueled
- **Computer room cooling**
  - single DX chiller used for wintertime cooling
  - tied to chiller/heater to meet summer loads

Hurley Building
Lighting Improvements

- **Lighting improvements made in 1992**
  - **new reflectors, lamps and ballasts**
  - **light levels maintained or improved**
- **Funded by Boston Edison Company**
- **Implemented in Hurley building and 3 other buildings coincidentally with HVAC project**
- **Savings for all 4 buildings**
  - **4.86 million kWh peak, 1.82 million kWh off-peak**
  - **1.7 MW demand reduction**
  - **$580,000 annually**

Hurley Building
New Maintenance Contract

- **Renegotiated scope of maintenance contract**
  - **replaced failing absorption chiller**
  - **replaced computer room DX units with chilled water coils and one electric chiller**
  - **eliminated most pneumatic controls**
- **Additional maintenance contract for new absorption chiller/heaters**
- **Total maintenance costs reduced by at least $126K annually**

Hurley Building
Integrated Energy Program

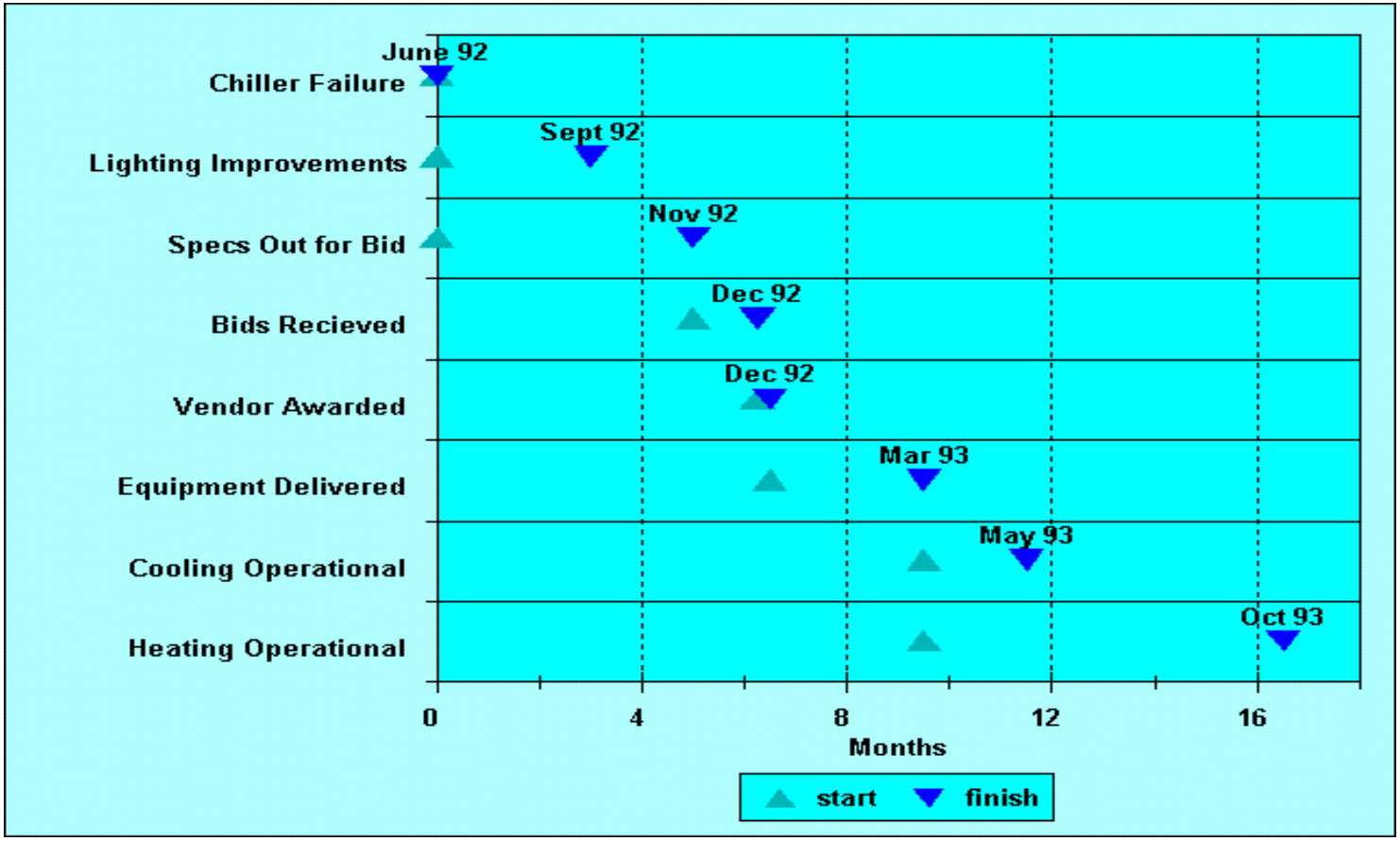
	Purchase & Installation Cost	Monetary Savings in First Year($)				Gas Cost ($)	Total Savings ($)	Payback period (years)
		Steam Savings	Steam Condensate Savings	Electric Savings	Maint. Savings			
New Chiller/Heaters	987,000	304,221	12,449	---	---	170,491	146,179	6.8
Computer Room Cooling	318,000	---	---	39,520	---	21,528	17,992	17.7
Domestic Water Heater	37,000	3,588	147	---	---	1768	1,967	18.8
EMS System & Hydronic Coils	317,000	28,315	---	1,063	---	---	29,378	10.8
Lighting Improvements	---	---	---	100,000	---	---	100,000	0.0
New Maintenence Contract	---	---	---	---	140,000	---	140,000	0.0
Total	1,659,000	336,124	12,596	140,583	140,000	193,787	435,516	3.8

- Lighting improvements and new maintenance contract help pay for HVAC system changes

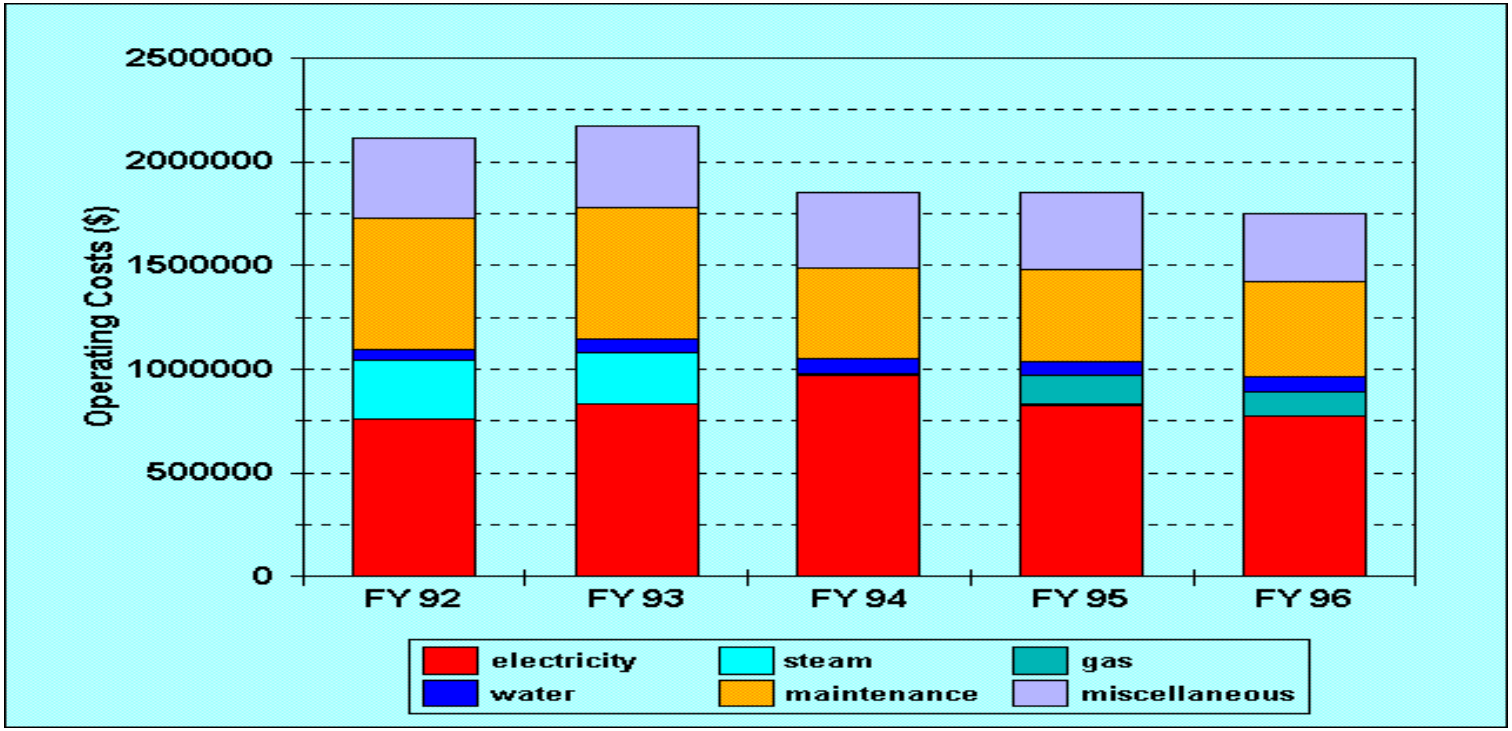
Hurley Building
Financing Structure

- **Chiller/heater cost**
  - **$565,000 purchase cost paid up front**
  - **$472,000 installation costs financed over 3 years**
  - **$50,000 rebate from Boston Gas**
- **Computer room, water heater, EMS system, hydronic coils financed over 3 years**
- **Lighting improvements funded by Boston Edison Company in 1992**

Hurley Building
Project Timeline



Hurley Building
Operating Cost Changes



- Gas replaces steam for cooling
- Maintenance costs reduced

Hurley Building
Project Results

- Chiller/heaters fit into mechanical room
- Utility savings of ~ $300,000 annually
- Maintenance savings of ~ $140,000 annually
- Replacement of steam with natural gas
- Improved building comfort from better balancing and EMS system controls
- $420,000 increased operating cost revenues by finding occupancy rate to be 88% not 64%